



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/587,881

08/01/2006

Yasushi Yagi

2006_1186A

3846

513

7590

11/09/2010

WENDEROTH, LIND & PONACK, L.L.P.

1030 15th Street, N.W.,

Suite 400 East

Washington, DC 20005-1503

EXAMINER

SMITH, PHILIP ROBERT

ART UNIT

PAPER NUMBER

3779

NOTIFICATION DATE

DELIVERY MODE

11/09/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ddalecki@wenderoth.com

coa@wenderoth.com

Office Action Summary	Application No. 10/587,881	Applicant(s) YAGI ET AL.	
	Examiner PHILIP R. SMITH	Art Unit 3739	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 August 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 and 17-19 is/are pending in the application.
- 4a) Of the above claim(s) 2-8, 10-13 and 18 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19 is/are allowed.
- 6) ☒ Claim(s) 1, 9, 14 and 17 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>8/20/10</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

IDS

[01] The IDS filed 8/20/10 is blank.

Specification

[02] The objections to the specification set forth in the Office action of 5/20/10 are withdrawn in view of the amendments of 8/20/10.

Claim Rejections - 35 USC § 112, Paragraph One

[03] The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

[04] The rejection of claim(s) 16 set forth in the Office action of 5/20/10 is withdrawn in view of the arguments of 8/20/10.

Claim Rejections - 35 U.S.C. 112, Paragraph Two

[05] The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

[06] The rejection of claim(s) 9, 14-16 set forth in the Office action of 5/20/10 are withdrawn in view of the amendments of 8/20/10.

Claim Rejections - 35 USC § 103

[07] The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

[08] The rejection of claim(s) 1,9,14 as being unpatentable over Gombrich (6,081,740) in view of Heung-Yeung Shum as set forth in the Office action of 5/20/10 are withdrawn in view of the amendments of 8/20/10.

Art Unit: 3739

[09] Claim(s) 1,9,14,17 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Iddan (2004/0249247) in view of Heung-Yeung Shum and R. Szeliski, "Construction and Refinement of Panoramic Mosaics with Global and Local Alignment," *Proc. Int'l Conf. Computer Vision*, pp. 953-958, 1998.

[10] With regard to claim 1: Iddan discloses an endoscope system for taking images of an inside of an object, comprising:

[10a] an omnidirectional camera ("image sensor 208" [0016]) operable to take a plurality of images of the inside of the object in a living body, which is capable of motion;
and

[10b] an image generation unit ("a processor" operable to generate a panoramic image of the inside of the object by performing a video mosaicking process [] on the plurality of images obtained by said omnidirectional camera, said processes being intended for pasting the images, estimating camera motion, correcting previously definable motion in the living body and correcting previously indefinable internal deformation in the living body;

[10c] wherein said image generation unit is operable to generate the panoramic image such that the panoramic image has a fixed visual angle with respect to each of directions perpendicular to a traveling direction of said omnidirectional camera, by performing the video mosaicking process on the plurality of images obtained by said omnidirectional camera.

[0018] In one embodiment, as tube 200 of endoscope 201 traverses a body lumen 205, imaging unit 206 may capture images of a slice 207 of body lumen 205. For example, a ring shaped slice of a portion of tissue located behind the distal tip of the endoscope 201 may be imaged. The ring shaped slice may encompass a 360 degree view

surrounding the circumference of the endoscope. Illumination unit 212 may illuminate the slice 207 of body lumen 205. The light from the illuminated slice 207 may be reflected by reflective surface 214, focused by lens 210, and received by imager 208 which may capture an image of the slice 207 of body lumen 205 from an area surrounding tube 200 of endoscope 201. In an embodiment, since tube 200 may include transparent segments 216 in the shape of a ring of tube 200, the captured image may include a reflected image of a ring-shaped slice 207 of body lumen 205. It is noted that lens 210 may be configured, placed and/or aligned to filter and/or focus light from body lumen 205, such that only light from a desired portion of body lumen 205, for example, a ring-shaped slice 207, falls on image sensor 208. The image captured by image sensor 208 may include a substantially complete 360 degrees image of a slice of body lumen 205. Alternatively slices may include other configurations, for example, a 270 degree image, a 210 degree image, a 180 degree image, or any other number of degrees between 0 and 360.

[0019] In some embodiments, the panoramic image of a slice 207 of body lumen 205 may be ring-shaped. Such an image may be recorded as or converted into a rectangular image or into other shapes. In one embodiment, the conversion may be performed, for example, by a processor that may be included in endoscope 201 or that may be housed in a separate unit. In some embodiments, processor 234 or another processor may convert images into a rectangular image. The conversion may be performed, for example, using methods as known in the art to "flatten" a ring-shaped image into a rectangular image. The conversion may be applied to one image, or to a group or a batch of sequential or non-sequential images. In some embodiments, one or more of a series of panoramic images of slices 207 of body lumen 205 may be connected to form a moving image of body lumen 205 or a sequential chain of images of slices 207 of body lumen 205. In some embodiments a video image may be captured. In some embodiments, depending on the configuration of one or more reflecting surfaces, the image as recorded on an imager may be substantially rectangular.

[0020] Additionally or alternatively, images of slices 207 of body lumen 205, may be placed, aligned and/or combined together, for example, side by side, to create a combined image or several combined images from a plurality of images of slices 207. The

combination of images of slices 207 may be performed, for example, by a processor as is discussed herein.

- [10d] Iddan does not disclose a motion correction process or an image modification process through energy minimization on the plurality of images obtained by said omnidirectional camera.
- [10e] Heung-Yeung (hereafter "HY") discloses a motion correction process ("motion estimate" p957), and an image modification process through energy minimization on the plurality of images obtained by said camera ("minimize the difference between screen coordinates of all overlapping pairs of images" p955), said processes being intended for estimating camera motion ("camera translation" p957), correcting previously definable motion in the living body and correcting previously indefinable internal deformation in the living body ("moving objects") p957.
- [10f] At the time of the invention, it would have been obvious to a person of ordinary skill in the art to provide motion correction and image modification through energy minimization on the images captured by Iddan's device. A skilled artisan would be motivated to do so in order to generate a panoramic image that is free from misregistrations caused by camera translation or moving objects, as taught by HY.
- [11] With regard to claim 9: the image generation unit disclosed by Iddan in view of HY comprises:
- [11a] a feature region cutout unit operable to cut out a plurality of feature regions ("use the patch centers as prospective "feature" points" p955 of HY) having a

Art Unit: 3739

predetermined size (“e.g., 16 x 16 pixels” p955) from each of the plurality of images obtained by said omnidirectional camera; and

[11b] a panoramic image generation unit operable to define an energy based on the plurality of feature regions included in each of the plurality of images, associate the plurality of feature regions between the plurality of images such that the energy is minimized, and generate a panoramic image of the inside of the object based on the association result (“minimize the difference between the ray directions of corresponding points using a rotational panoramic representation with unknown focal length” p955).

[12] With regard to claim 14: the predetermined energy is determined based on a degree of deviation between a plurality of control points selected from a first image taken by said camera and a plurality of control points, in a second image taken by said camera, which respectively correspond to the plurality of control points selected from the first image (“corresponding points between pairs of images are automatically obtained using patch-based alignment” p955).

[13] With regard to claim 17: said omnidirectional camera is mounted on a tip of a probe that is to be inserted into a digestive organ.

Allowable Subject Matter

[14] Claim(s) 19 is/are allowed.

[15] Claim(s) 15 is/are would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Response to Arguments

Art Unit: 3739

- [16] Applicant's arguments filed 8/20/10 have been fully considered but they are not persuasive.
- [17] Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

- [18] Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).
- [19] A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.
- [20] Any inquiry concerning this communication or earlier communications from the examiner should be directed to PHILIP R. SMITH whose telephone number is (571)272-6087 and whose email address is philip.smith@uspto.gov. The examiner can normally be reached between 9:00am and 5:00pm.
- [21] If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Linda Dvorak can be reached on (571) 272 4764.
- [22] Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published

Art Unit: 3739

applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Philip R Smith/

Primary Examiner, Art Unit 3779

/Thomas J Sweet/

Supervisory Patent Examiner, Art Unit 3779